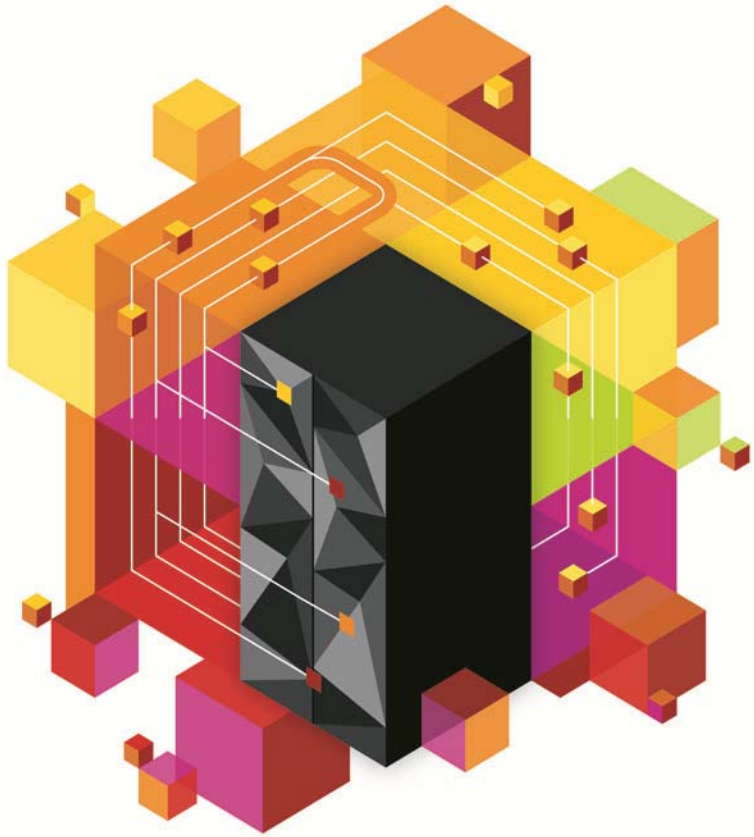
IBM zEnterprise Technology Summit



Accelerate IMS application modernization

Presenter –
Date:

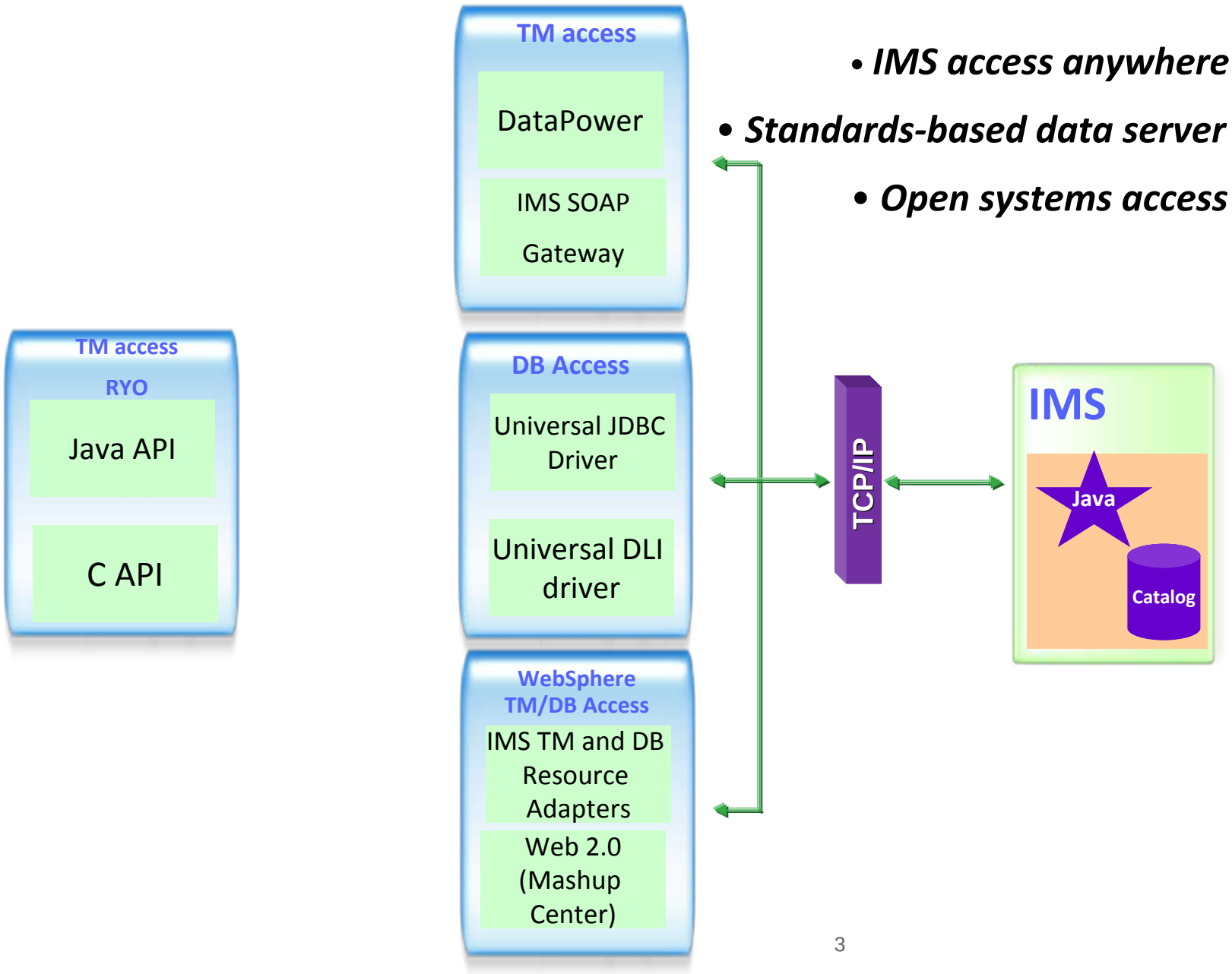
Agenda

IMS modernization overview

- **IMS database solutions**
  - Integration opportunities and futures
- **IMS transaction management solutions**
  - Integration opportunities and futures
- **DataPower and IMS connectivity**
  - Current and future

IMS Modernization Solutions

- *IMS access anywhere*
- *Standards-based data server and TM*
- *Open systems access*



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IMS Open Database

Solution statement

- **Extend the reach of IMS data**
  - Offer scalable, distributed, and high-speed local access to IMS database resources

Value

- **Business growth**
  - Allow more flexibility in accessing IMS data to meet growth challenges
- **Market positioning**
  - Allow IMS databases to be processed as a standards-based data server

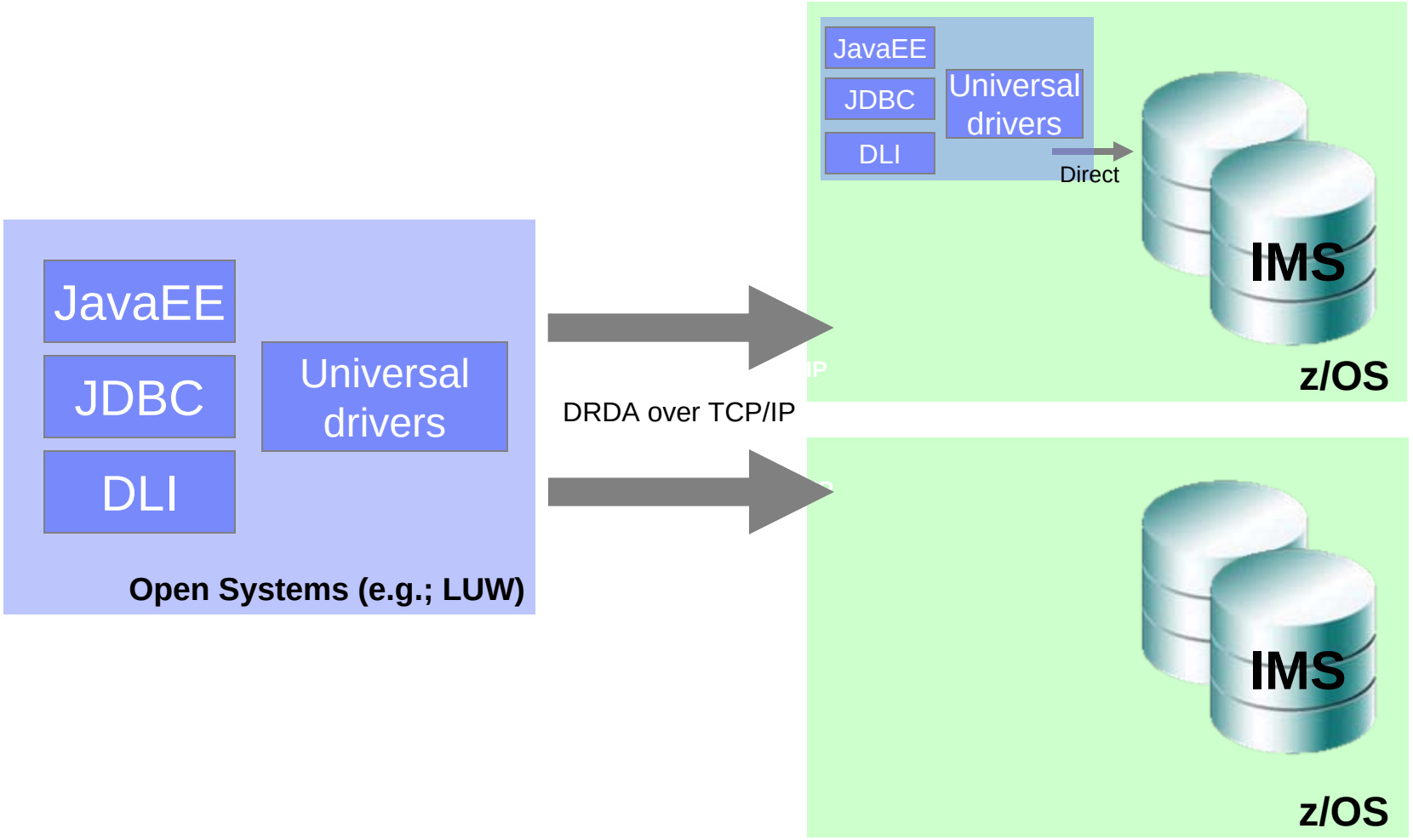
Key differentiators

- **Standards-based approach (Java Connector Architecture, JDBC, SQL, DRDA)**
- **Solution packaged with IMS**

Enables new application design frameworks and patterns

- **JCA 1.5 (Java EE)**
- **JDBC**

IMS Open Database



Open Database and the Universal drivers

Deep synergy with the IMS catalog

- Direct access to IMS metadata in the catalog
- Virtual and cloud deployment capabilities
  - No longer file-system dependent for metadata
- Industry-leading data type support
  - Complex and flexible
- Mapping support

Deep synergy with Java z/OS and z196

- Significant performance improvements
- Continued partnership with Java z/OS lab

Continued SQL standardization and support

- Including similar connection parameters as DB2 for commonality across IBM drivers
- More to come

Continued integration across the IBM portfolio

Maps

Mapping support

- A Map is metadata that describes how a field (or set of fields) are mapped for a particular segment instance
- Metadata captures the various cases and for each case defines the set of fields to be used for that case
- Maps can be defined to the catalog
- Example
  - Insurance segment mapped multiple ways depending on value of a ‘Policy Type’ field

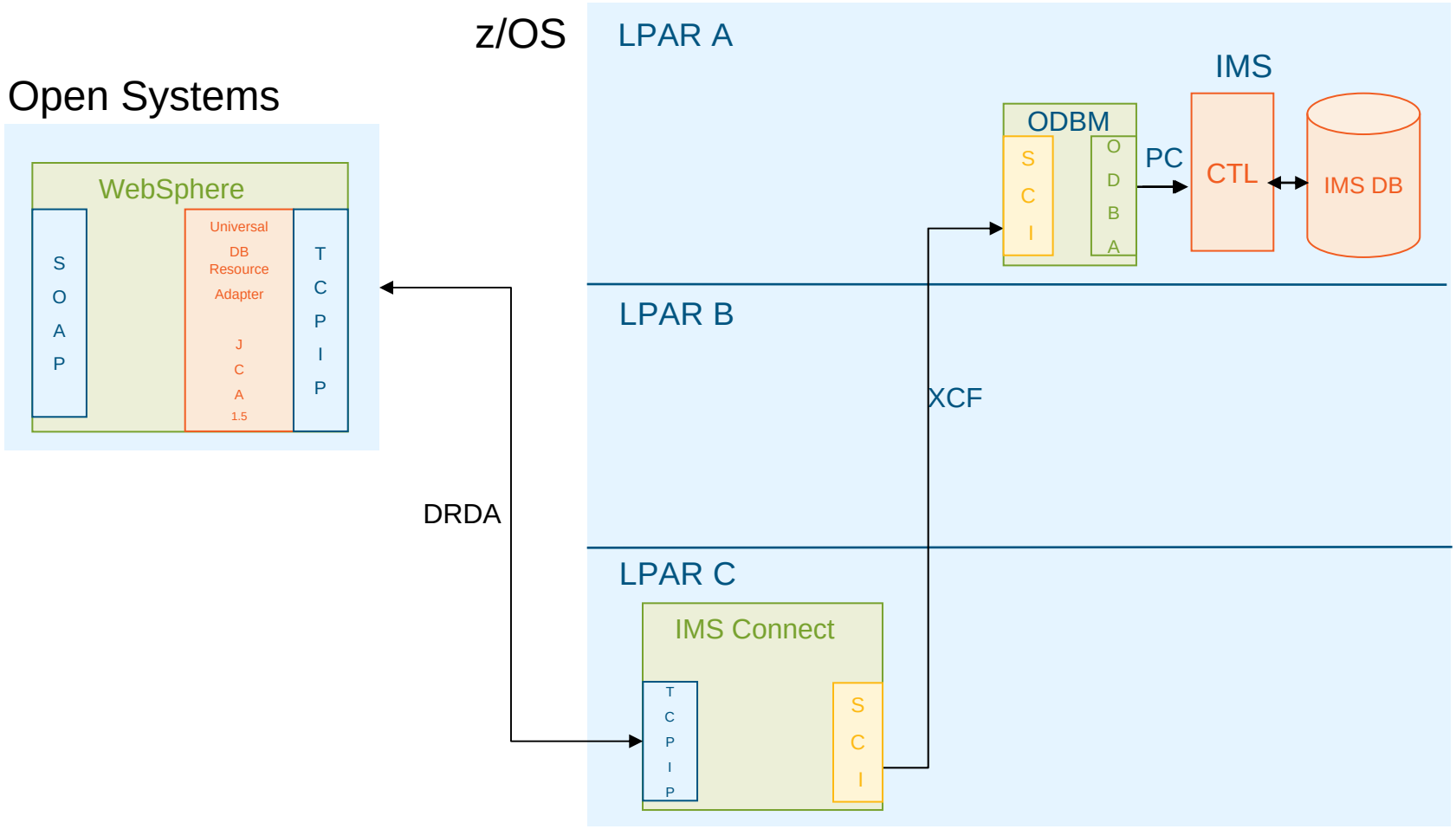
Policy Type	Property Type	Rooms	Value	Address	Make	Model	Year	Value	Color
M	-	-	-	-	Ford	Escort	1989	2K	Red
H	Single Family	5	500K	555 Disk Drive Way, 95141	-	-	-	-	-

Additional enhancements

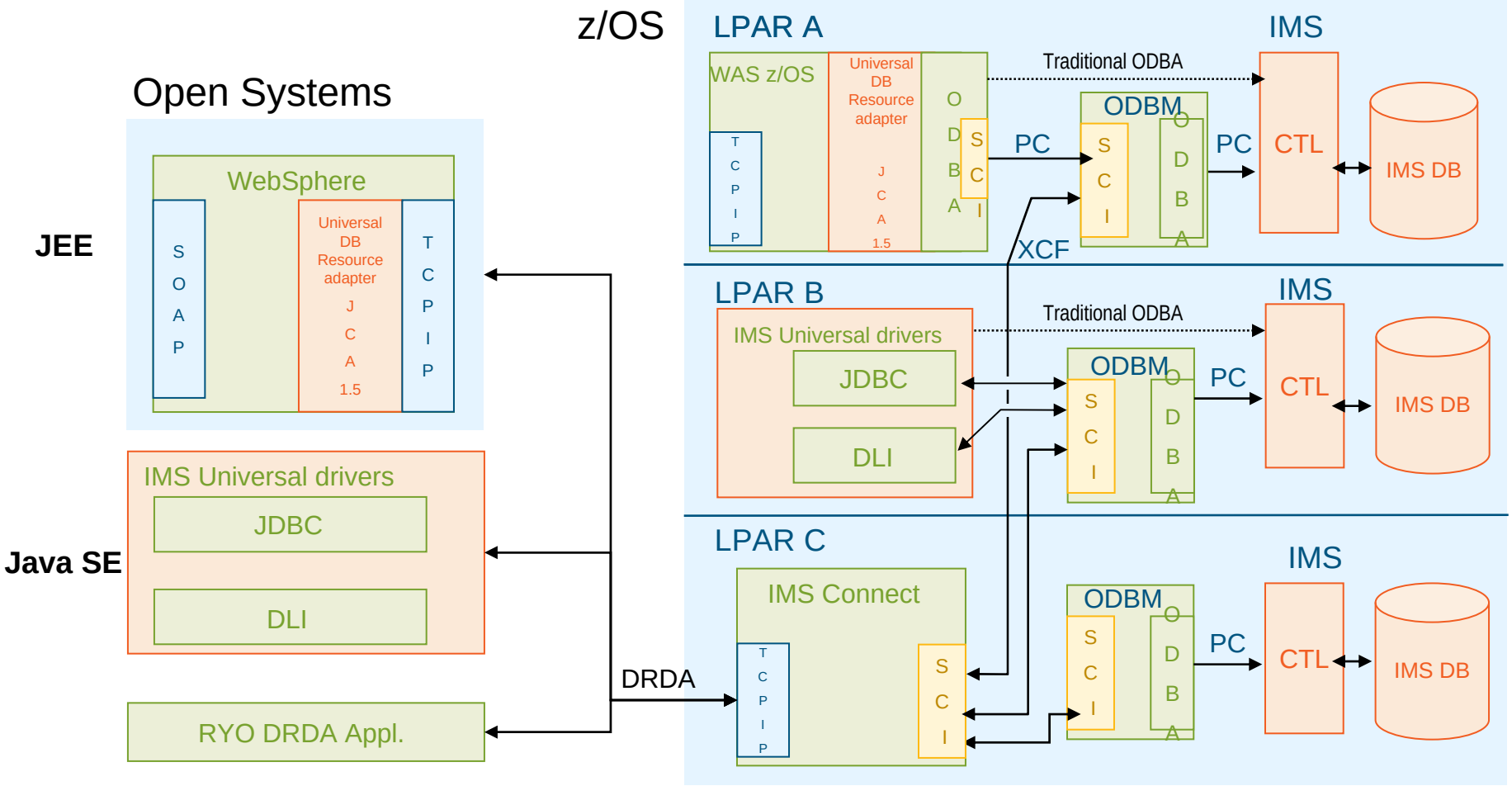
- **SQL**
  - FETCH FIRST <n> ROWS ONLY
  - INNER JOIN <table2> ON <table1.col1> = <table2.col2>
- **Connection properties**
  - currentSchema
  - maxRows
  - fetchSize
  - Tracing
    - traceFile, traceFileAppend, traceDirectory, traceLevel
- **Variable length segment support**
  - VL segments contain a two byte length (LL) field that will identify the size of the segment instance
  - Universal Drivers are now sensitive to the LL field of a VL segment and will manage the IO area of the segment instance on all CRUD calls

FIELD=PERSONAL_INFO (VLOB min length=82 max length=112)			
INNER FIELD=LENGTH (2 bytes)	INNER FIELD=NAME (30 bytes)	INNER FIELD=ADDRESS (50 bytes)	INNER FIELD=EMAIL (optional field 30 bytes)
112	RICHARD	555 Bailey Ave	tran@abc123.com
82	KEVIN	555 Bailey Ave	<does not exist physically on disk>

IMS Open Database environment

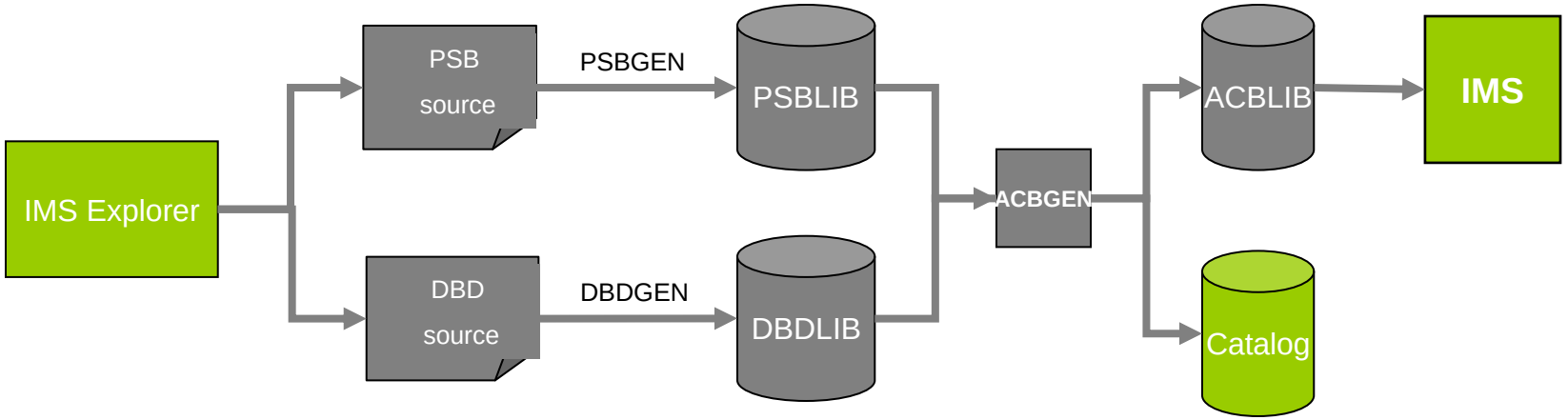


IMS Open Database environment

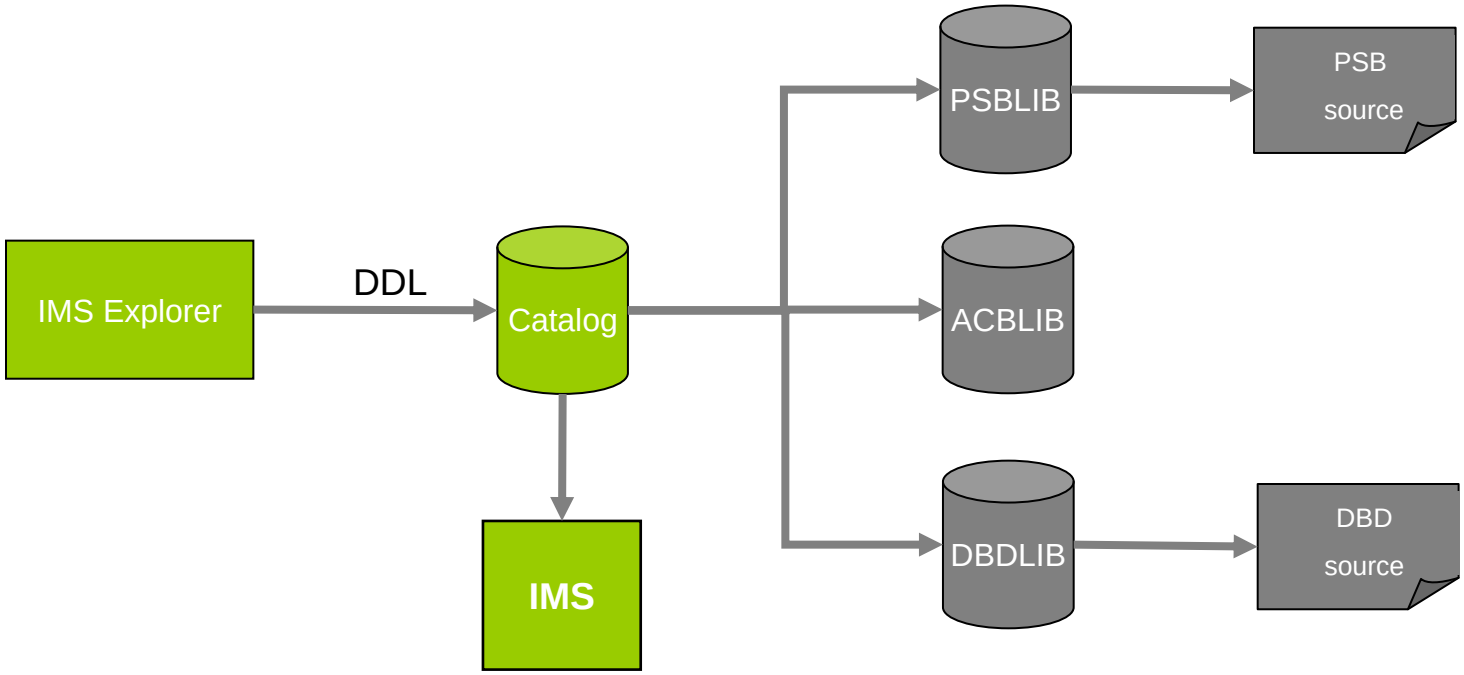


IMS 12 catalog

- **Trusted IMS metadata information**
- **Comprehensive view of IMS database metadata (including application metadata) managed by IMS with standard access patterns (JDBC/SQL)**
- **Offers metadata discovery and exchange via IMS Open Database and the IMS Explorer for Application Development**
- **Scalable Open Database solution – large scale deployment into virtualized production and test environments**
- **Enables broad IMS integration into the IBM and non-IBM portfolio of tools (Optim Development Studio, Rational Asset Analyzer, InfoSphere Data Architect, etc)**



IMS catalog – intended support

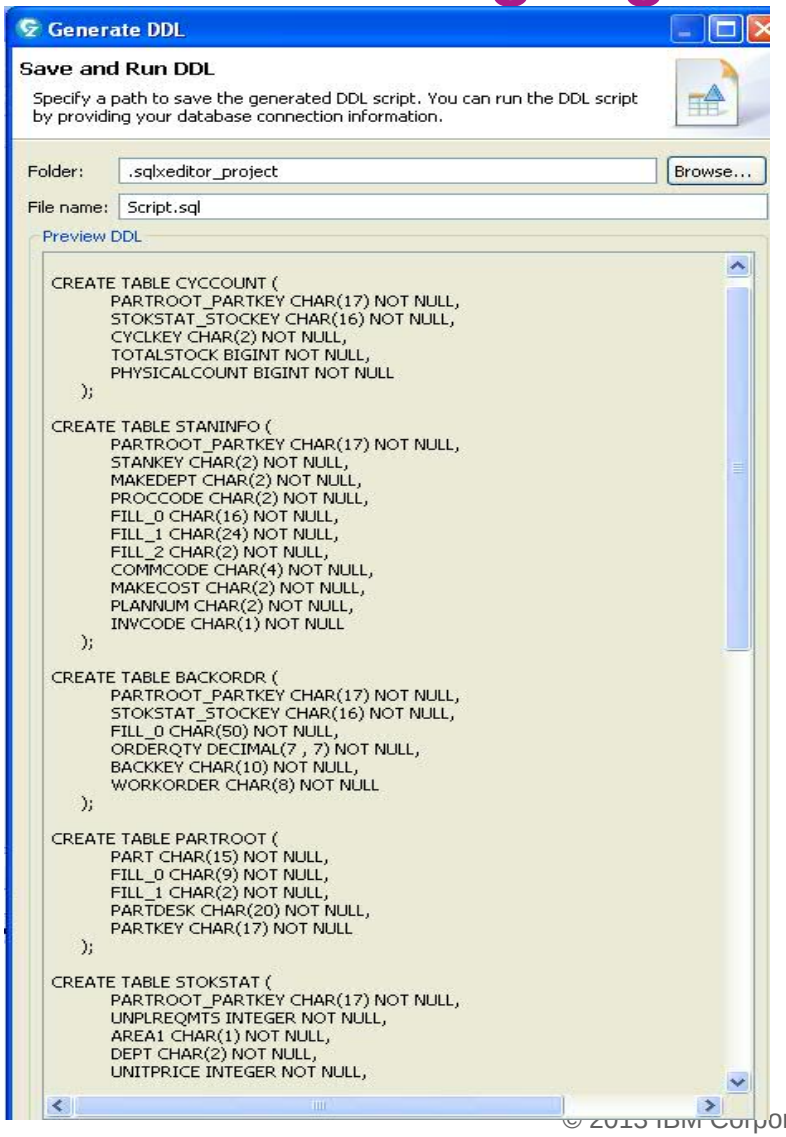


IMS DB changes *start* with catalog

- IMS loads resource information from catalog
- ACBLIB/PSBLIB/DBDLIB updates will be the by-product of catalog updates
  - Tools that use these libraries can continue to operate, but should migrate to catalog
- PSB and DBD source can still be optionally generated from PSBLIB and DBDLIB

Dynamic database - Data Definition Language

- SQL incorporates DDL to modify the schema of a database
- Authoring DDL is straight-forward with sophisticated tooling support in the industry
- SQL/DDL can be used to update/add metadata in the catalog without the need of a GEN
  - Directly update the catalog
- IMS can be notified of such an update and load the new definitions
- It is our intention to offer this type of dynamic definition for IMS

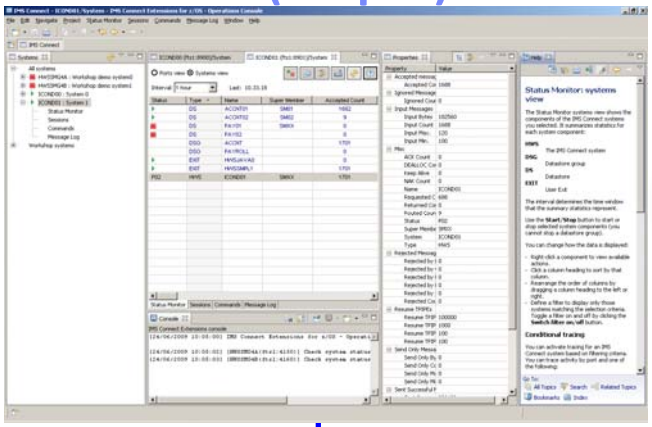


Intended SQL engine investment

- **Current SQL engine is Java-based**
  - As a result only supports Java clients
- **IMS intends to invest in a native SQL engine**
  - Could support COBOL and PLI clients
    - Dynamic and even static SQL could be supported
  - Engine would require the IMS catalog

IMS user interface enhancements

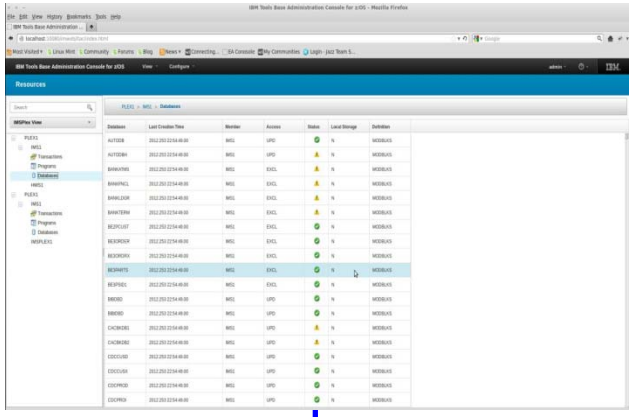
IMS Explorer for Development (Eclipse)



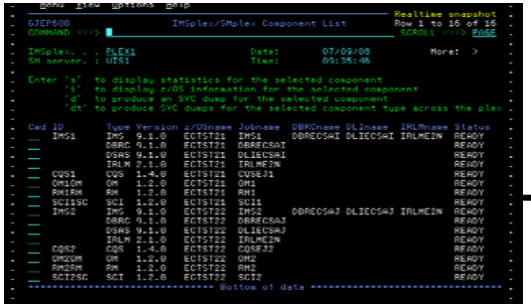
Developers

Administrators

IMS Explorer for Administration (Web Browser)

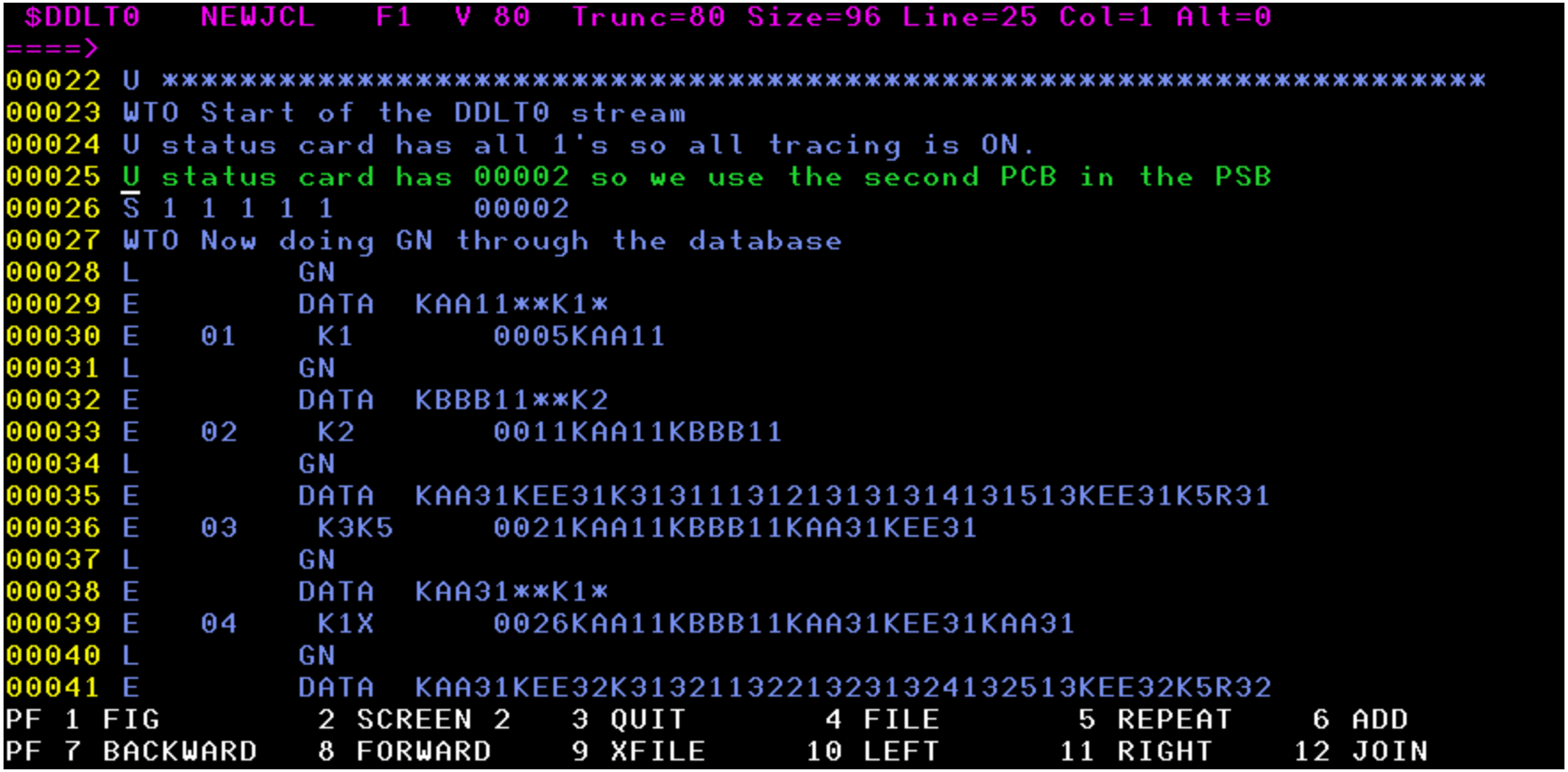


ISPF

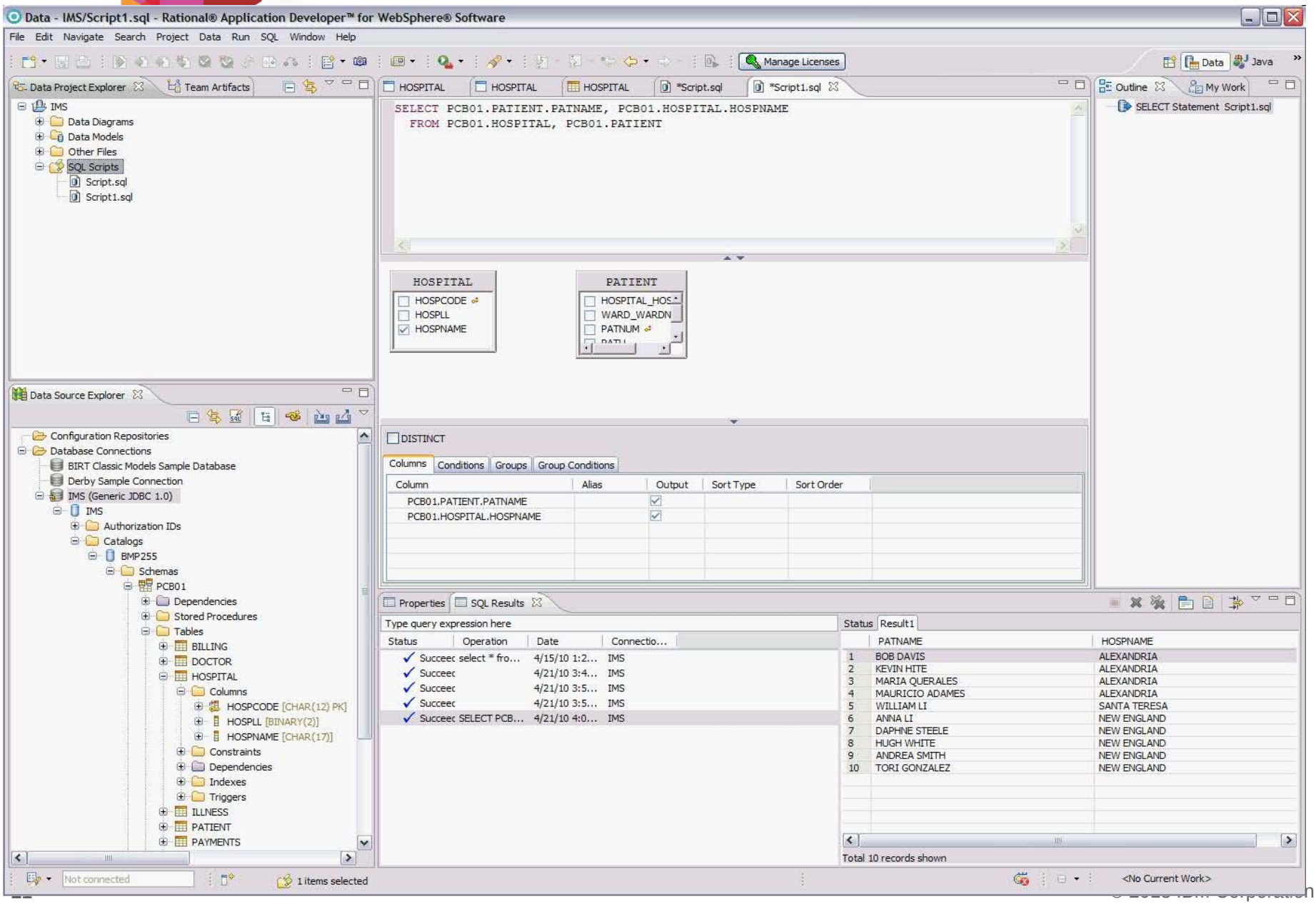


IMS

IMS Explorer for Development



IMS Explorer for Development

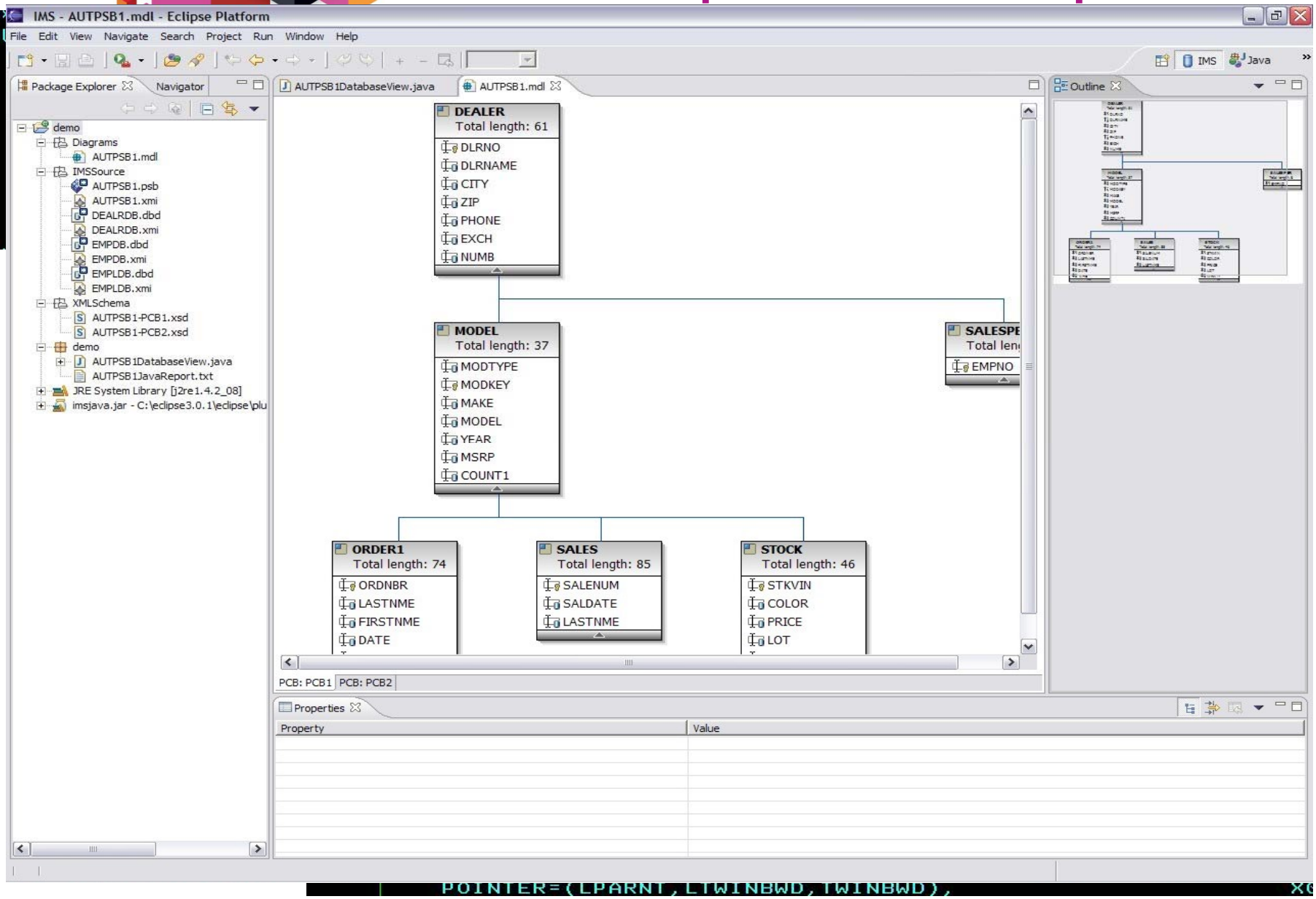


IMS Explorer for Development

```
AUTOLPCB PCB TYPE=DB,DBDNAME=AUTOLDB,PROCOPT=AP,KEYLEN=100
         SENSEG NAME=DEALER,PARENT=0
         SENSEG NAME=MODEL,PARENT=DEALER
         SENSEG NAME=ORDER,PARENT=MODEL
         SENSEG NAME=SALES,PARENT=MODEL
         SENSEG NAME=STOCK,PARENT=MODEL
         SENSEG NAME=STOCSALE,PARENT=STOCK
         SENSEG NAME=SALESPER,PARENT=DEALER
         SENSEG NAME=SALESINF,PARENT=SALESPER
         SENSEG NAME=EMPLINFO,PARENT=SALESPER
```

```
    DBD    NAME=AUTODB,ACCESS=(HDAM,OSAM),                          X
           RMNAME=(DFSHDC40,1,5,200)
    DATASET DD1=DFSDLR
    SEGM   NAME=DEALER,PARENT=0,BYTES=61
    FIELD  NAME=(DLRNO,SEQ,U),BYTES=4,START=1,TYPE=C
    FIELD  NAME=DLRNAME,BYTES=30,START=5,TYPE=C   SECINDX1 SEARCH1
    FIELD  NAME=CITY,BYTES=10,START=35,TYPE=C     SECINDX1 SEARCH2
    FIELD  NAME=ZIP,BYTES=10,START=45,TYPE=C      SECINDX1 SUBSEQ
    FIELD  NAME=PHONE,BYTES=7,START=55,TYPE=C     SECINDX1 DUPD
    LCHILD   NAME=(SINDXB,SINDEX22),POINTER=INDX
    XDFLD  NAME=XFLD2,SEGMENT=MODEL,                               X
           SRCH=(MAKE,MODEL),                                      X
           SUBSEQ=(YEAR,/SX1),                                     X
           DDATA=COUNT
    SEGM   NAME=MODEL,PARENT=DEALER,BYTES=37
    FIELD  NAME=(MODKEY,SEQ,U),BYTES=24,START=3,                   X
           TYPE=C                          SECINDX2 SEARCH
    FIELD  NAME=MODTYPE,BYTES=2,START=1,TYPE=C
    FIELD  NAME=MAKE,BYTES=10,START=3,TYPE=C        SECINDX2 SEARCH
    FIELD  NAME=MODEL,BYTES=10,START=13,TYPE=C      SECINDX2 SEARCH
    FIELD  NAME=YEAR,BYTES=4,START=23,TYPE=C        SECINDX2 SUBSEQ
    FIELD  NAME=MSRP,BYTES=5,START=27,TYPE=P
    FIELD  NAME=COUNT,BYTES=2,START=32,TYPE=P       SECINDX2 DUPD
    FIELD  NAME=/SX1
    SEGM   NAME=ORDER,PARENT=MODEL,BYTES=74
    FIELD  NAME=(ORDNBR,SEQ,U),BYTES=6,START=1,TYPE=C
    FIELD  NAME=LASTNME,BYTES=25,START=7,TYPE=C
    FIELD  NAME=FIRSTNME,BYTES=25,START=32,TYPE=C
    FIELD  NAME=DATE,BYTES=10,START=57,TYPE=C
    FIELD  NAME=TIME,BYTES=8,START=67,TYPE=C
    LCHILD   NAME=(SINDXA,SINDEX11),POINTER=INDX
    XDFLD  NAME=XFLD1,SRCH=(LASTNME,FIRSTNME,ORDNBR),              X
           DDATA=DATE
    SEGM   NAME=SALES,PARENT=((MODEL,),(STOCK,PHYSICAL,AUTODB)),   X
           BYTES=85,                                               X
           POINTER=(LPARNT,LTWINBWD,TWINBWD),                      X
```

IMS Explorer for Development



IMS Explorer for Administration (intended direction)

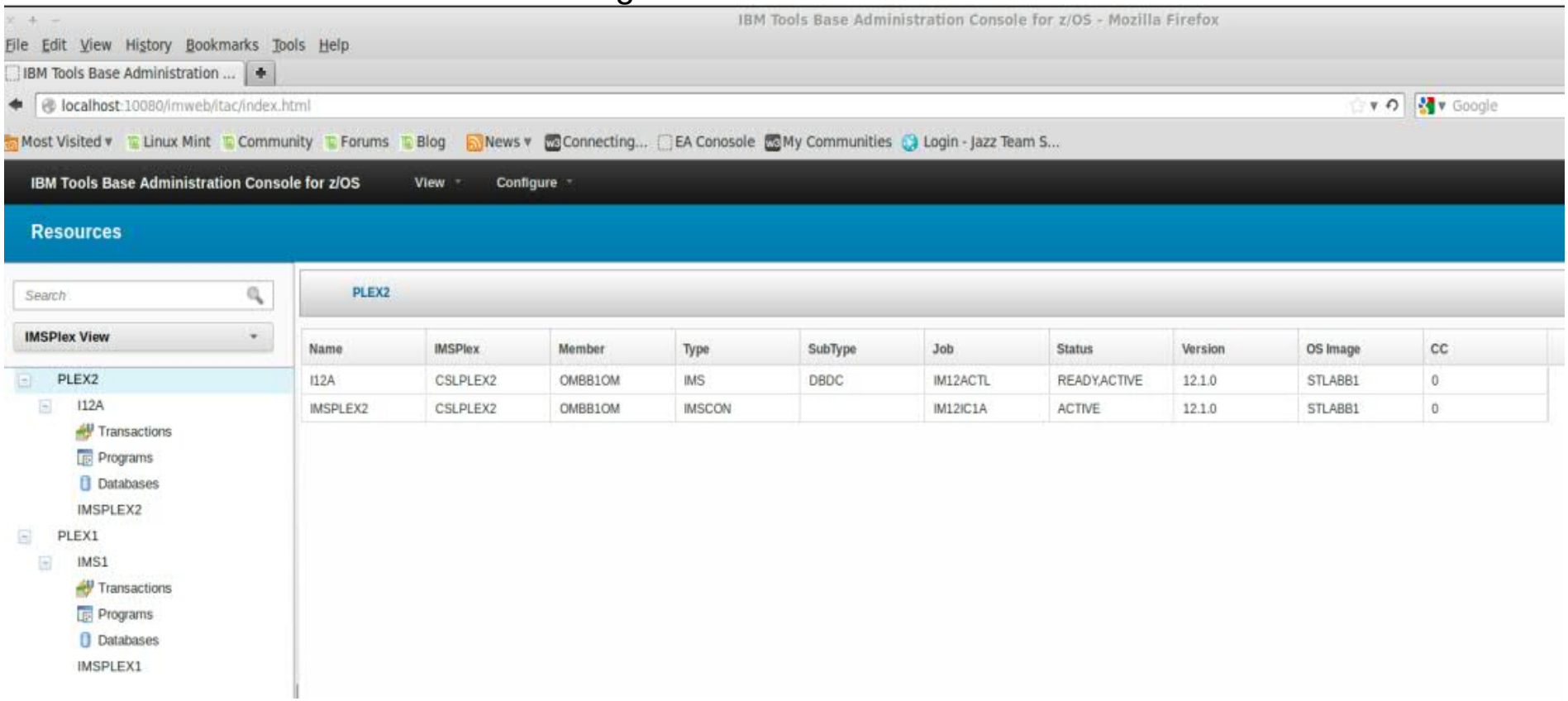
- **Provide IMS system programmers and DBAs a state-of-the-art user interface to manage, configure, and deploy IMS systems**
- **Full operational control over all IMS address spaces**
- **Full command of IMS resources**
  - Programs, transactions, databases, etc
- **Immediately react to and resolve issues in the system**
- **Cloud-style IMS system management**
  - IMS region profiling, application profiling, application deployment

IMS Explorer for Administration (intended support)

IMSplex at-a-glance

Immediate insight into properties of any given IMSplex

Drill-down for advanced insight and action

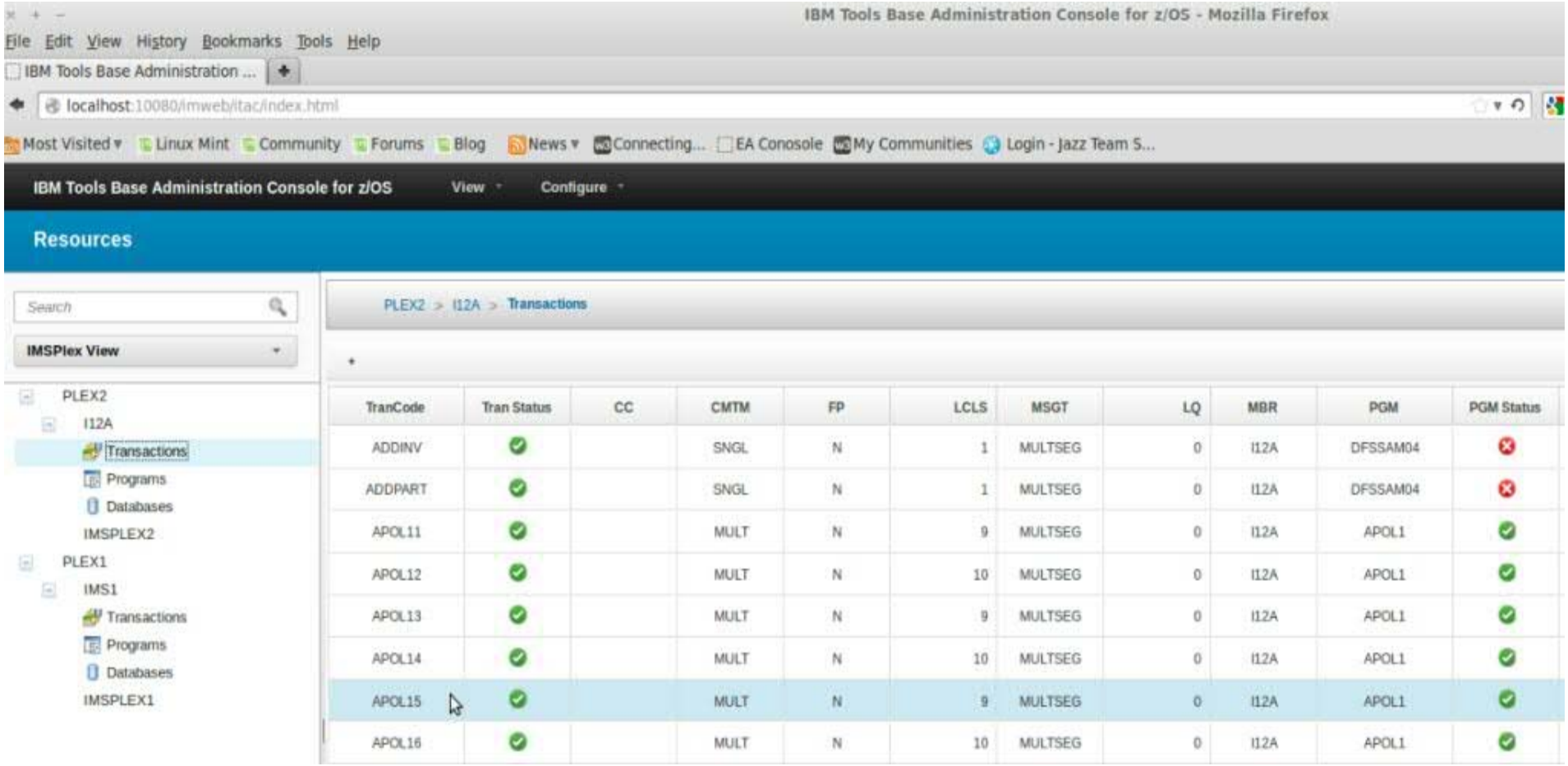


IMS Explorer for Administration (intended support)

Transaction insight

Transaction and program status immediately available

Operate directly on transactions

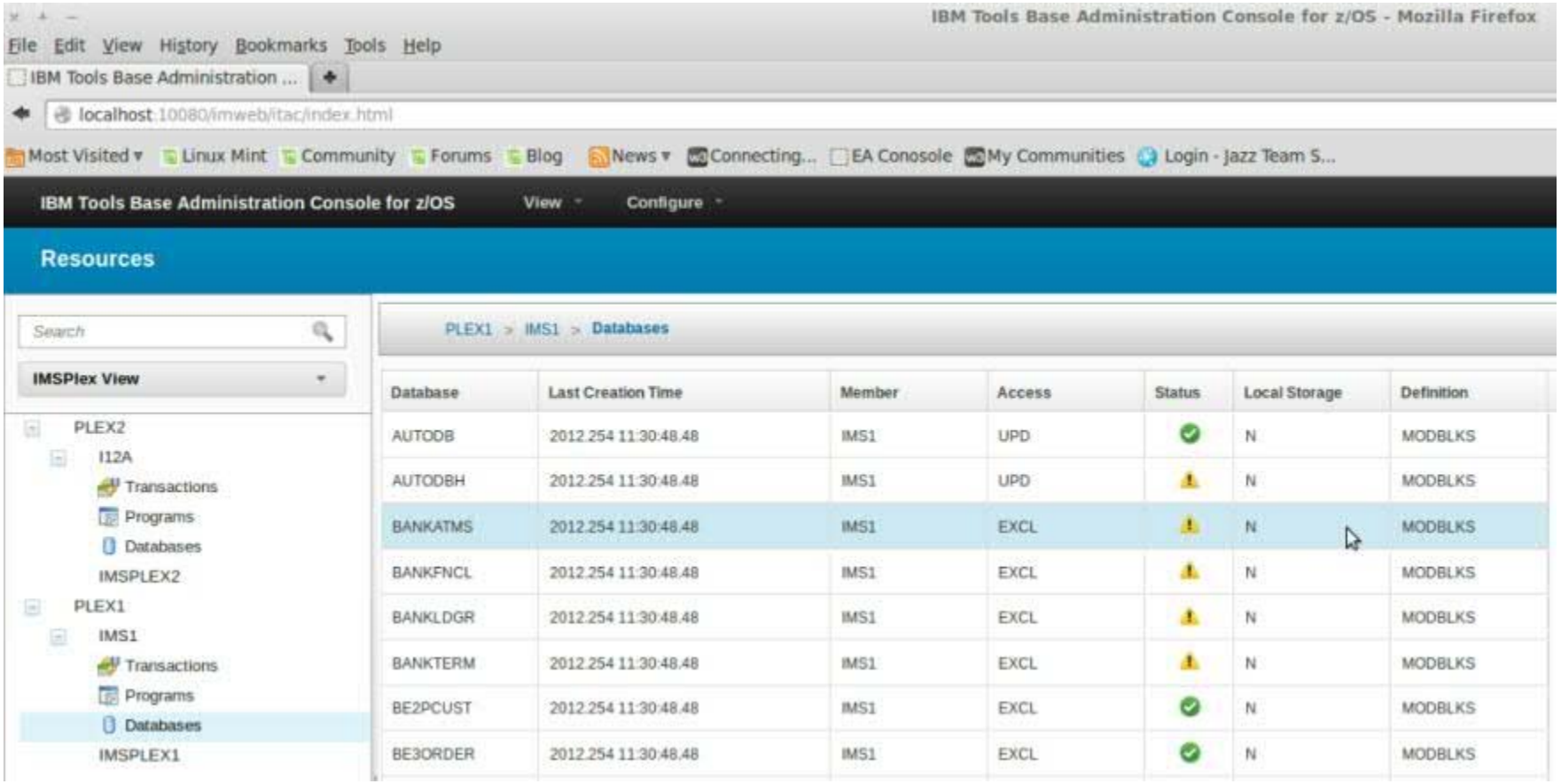


IMS Explorer for Administration (intended support)

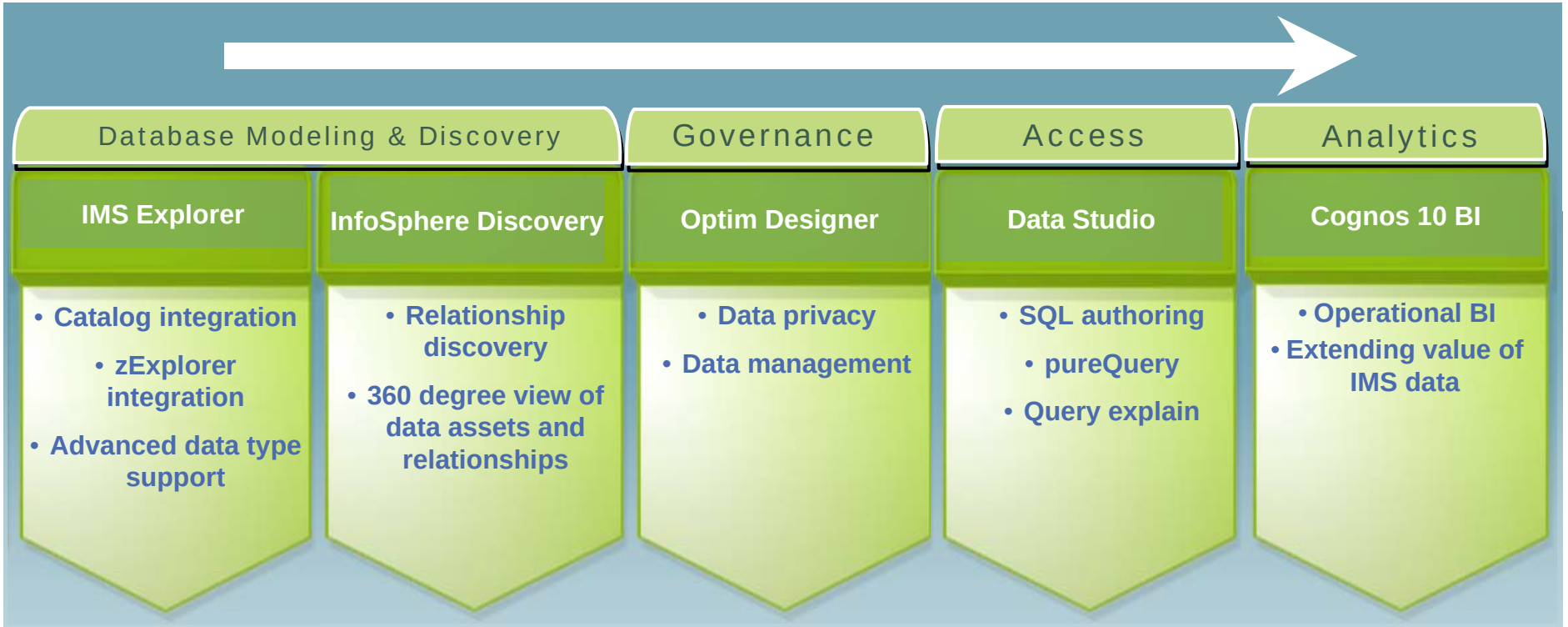
Database insight

Status and attributes immediately available

React and resolve issues



Intended portfolio integration



Intended runtime integration

- **WebSphere Message Broker**
  - Leverage the JDBC driver support in WMB in order to offer access to IMS DB via the Universal JDBC driver
- **SAP**
  - SAP support for Java deployment accessing IMS DB using JDBC and SQL via the Universal drivers
- **.NET**
  - .NET data provider offering SQL access to IMS from the .NET platform

Java dependent region deployment

Java dependent region resource adapter

- Allows new IMS transactions (JMP, JBP) to be written in Java and managed by the IMS transaction manager
- Complete Java framework for applications operating in an IMS container
  - Message queue processing
  - Program switching
    - Deferred and immediate
  - Transaction demarcation
  - GSAM support
  - Additional IMS call support necessary for IMS transactions
    - INQY
    - INIT
    - LOG
    - Etc
- Shipped with type 2 Universal drivers

IMS TM Connectivity and Integration

Many IBM application servers already provide built-in support for IMS transaction access today

Java EE	Web Service				BPM	Complex Data Transformation
WebSphere Application Server or Java EE Server**	**SOAP Gateway**	**Datapower**	**WebSphere Message Broker**	**WebSphere Enterprise Service Bus**	**IBM Process Server**	**WebSphere Transformation Extender**
		Enterprise Service Bus				
• Full SOA and Java EE Services • Inbound and Outbound from IMS	• Direct IMS SOAP endpoint for Web Services • Inbound and Outbound from IMS	• SOA appliances • Fast Web services and XML transformat-ion • Inbound to IMS	• Interoperate heterogeneous services and data environments • Inbound to IMS	• Java based Enterprise Service Bus • Inbound and Outbound* from IMS	• Business process automation and choreography • Inbound and Outbound* from IMS	• Transform complex data types • Inbound to IMS

**Additional coding may required. **Subset of functions supported with conditional support*

IMS TM Resource Adapter

- **Access IMS transaction with full Java EE and SOA support**
  - Customer-proven IMS modernization solution for over a decade
  - Industry-standard Java EE Connector Architecture (JCA/J2C) compliant
  - Integrate with a variety of Java EE or WebSphere-based servers with built-in QoS support (2PC, connection pooling, security management)
  - Support both call-in and callout from IMS
  - Support rapid application development with Rational tooling
  - Recommended to use with Java EE or WebSphere servers
- **Recent key enhancements**
  - Support non-IBM Java EE server (e.g. Weblogic, JBOSS) and WebSphere Application Server Community Edition
  - Callout enhancements
    - Retrieve callout messages from more than one IMS data stores with a single message-driven bean (MDB)
    - Auto reconnect for both IMS data store and IMS Connect connection failures

IMS Enterprise Suite SOAP Gateway

- **Enable IMS transactions as both web service providers and consumer**
  - Not an application server; not JEE container
  - Support industry web service standards
    - HTTP(S), SSL, SOAP, WSDL, WS-Security
  - Support both call-in and callout from IMS
  - Run on z/OS, zLinux, Windows
- **Recent key enhancements**
  - Simplified installation with SMP on z/OS and IM (IBM Installation Manager) on distributed platforms
  - Top-Down PL/I Provider support
  - Enhanced Management Utility with task automation
  - Major security enhancements: AT-TLS, Custom Authentication Module, SAML 1.1 Unsigned/Signed, SAML 2.0 Unsigned
  - Significant performance improvement

IMS Enterprise Suite 2.2. SOAP Gateway enhancements

- **Advanced installation**
  - Consistent installation story using IBM Installation Manager (IM) on all supported platforms
  - Make the post-SMP installation process flexible using IM on z/OS
- **End-to-end transaction tracking and monitoring**
  - Provide server “Health Check” statistics and log
  - Provide transaction tracking log
  - Enable end-to-end transaction tracking
    - Allow client applications to pass in user-specified or SOAP Gateway generated unique transaction message ID and propagate to IMS Connect and IMS OTMA
- **WS-Security**
  - Inbound with SAML 2.0 (signed), Outbound with SAML 1.1, 2.0 (unsigned)
- **Enhanced server shutdown options**
  - Immediate or Graceful (process all in-flight messages and come down gracefully)

Top-down, WSDL-first application development

- **Develop new IMS applications starting from a Web Services Description Language (WSDL) file**
- **Generate traditional programming language data constructs from WSDL or complex XML documents**
- **Top-down for IMS PL/I inbound request (available today)**
  - Rational Developer for System z (RDz) 8.0.3
  - Support top-down development scenario
  - Generate PL/I IMS application template, language structures and XML input/output converters
- **Intended support for Top-down PL/I Outbound and COBOL Inbound/Outbound**

IMS Enterprise Suite Connect API

- **Simple callable interfaces to send/receive messages to/from IMS Connect**
  - Java, C and C++ support
  - Normally use in Roll-Your-Own application that does not run in an application server
  - Extensible profiles that define connections and interactions
  - User does **not** have to understand:
    - Sockets programming
    - IMS Connect IRM headers and flags
  - Support all IMS Connect functions
- **Simplifies development of new IMS Connect client applications to access IMS transactions**

IMS Callout

- **IMS application callout to external application and web services**
  - New DL/I ICAL to synchronously callout from IMS
  - Enable IMS to synchronously and asynchronously callout to Java applications and web services
    - IMS TM Resource adapter, SOAP Gateway and Connect API
- **Recent enhancements**
  - Better diagnostics information for ICAL failure
  - Immediate Resume TPIPE timeout when no message available for Nowait and NoAuto modes
  - Notify client with an error when a late or invalid ACK received by OTMA after ICAL timeout
  - Clean up unused ICAL TPIPEs after two IMS checkpoints
  - Enhanced /DISPLAY command to display accumulated ICAL count

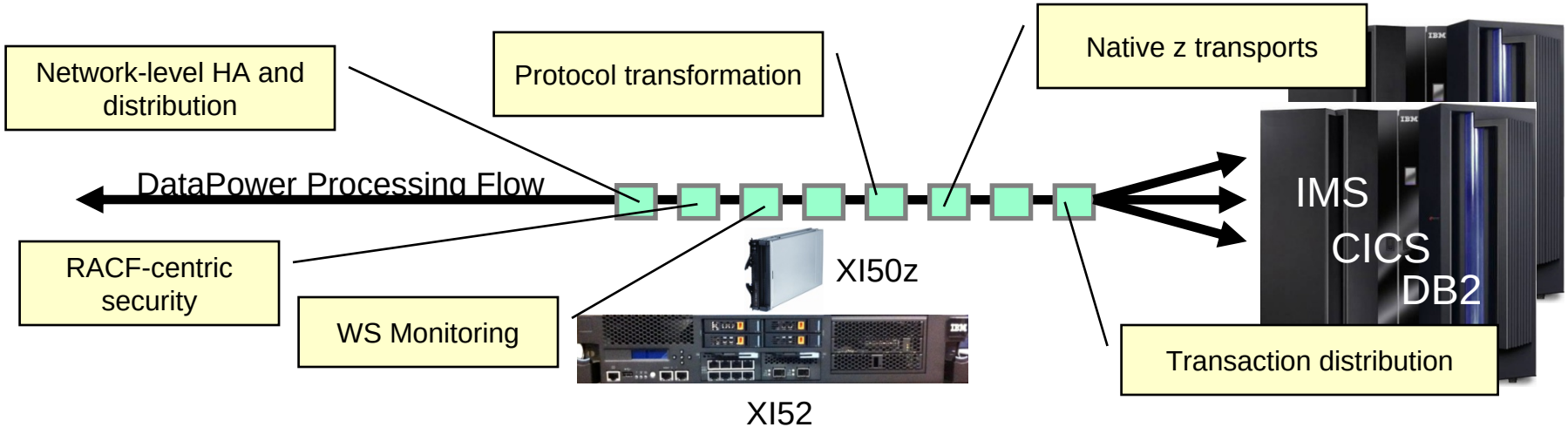
IMS 13 Callout enhancements

- **Synchronous program switch**
  - Extend IMS Synchronous Callout to invoke another IMS Application
  - DL/I ISRT continues to be used for asynchronous program switch
  - OTMA Descriptor enhanced to recognize an IMS transaction destination
  - Messages can be multi-segment
  - Value
    - Provides a single DL/I call interface to request a service regardless of where that service resides
    - Simplified integration and usability
- **OTMA Destination descriptor for WebSphere MQ asynchronous callout**
  - Expanded the current destination descriptor to support WebSphere MQ for asynchronous callout function
  - Value
    - Enhanced usability such that customer does not have to code OTMA routing exits

Premier System z web service enablement through DataPower SOA appliances

IBM cross-brand initiative

- **Deep synergy between DataPower, System z, Rational and Common Transformation tooling to support DataPower as the premier System z gateway for IMS, CICS and DB2**
- **Intended support for IMS DB access**
- **Intended support for top-down service approach for inbound and outbound IMS transactional requests**



IMS modernization - moving forward

- **Continued aggressive investment in**
  - Application modernization
  - Database modernization
- **Continued investment in integration opportunities**
- **Continued synergy with both software and hardware stack updates to maximize exploitation**
- **Continue to invest in solutions and technology which reduce the overall cost**

Questions??

Thank you!